ANNOUNCEMENT

UNITED PROJECTOR & FILM COMPANY

SPECIAL RELEASE

REEL NO.	TITLE

GENERAL PHYSICS

Experimental and Applied

by

PROF. W. D. HENDERSON, UNIVERSITY OF MICHIGAN

A remarkable series of motion picture demonstrations covering in logical sequence the fundamental principles and applications of elementary and advanced physics. Photographed in one of the largest and best equipped laboratories in the country, that of the University of Michigan, these experiments are performed by Professor Henderson, whose name guarantees their correctness and authority. The film is, of course, not intended as a substitute for the regular laboratory work of the student, but rather as a means of his gaining a wider knowledge of experimental physics than is possible with the apparatus of the average school.

A detailed statement of the subjects included in each reel follows:

***S1.1 Introductory

This reel covers the fundamental units (showing comparisons of the meter and yard, the kilogram and pound, and the liter and quart) and inertia (the ball and card experiment and the weight and string experiment).

***S1.2 Mechanics of Solids—Motion

Experiments are performed illustrating uniform motion, uniformly accelerated motion, accelerated motion on an inclined plane, simple harmonic motion in horizontal direction, simple harmonic motion in vertical direction, and simple harmonic motion in alternate directions.

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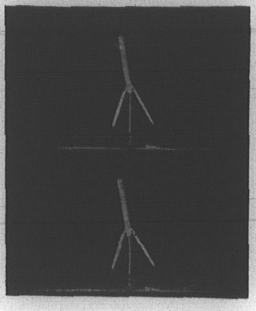
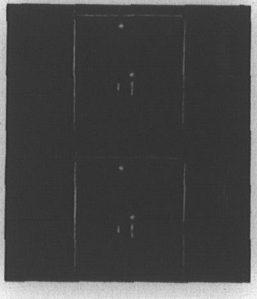
***S1.3 Mechanics of Solids—Center of Gravity and Equilibrium



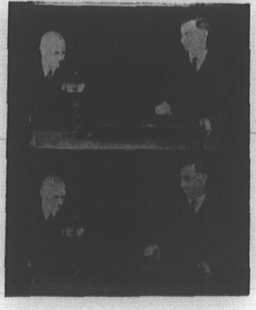
Finding the center of gravity of a body of irregular outline. The reel also gives two very striking experiments in equilibrium, one on stable equilibrium and one on unstable equilibrium.

***S1.4 Mechanics of Solids—Levers, Pulleys, Wheel and Axle



This reel gives very carefully worked out experiments of lever of the first class, second class and third class, showing the exact mechanical advantage of each type of lever. With the experiments in levers is also shown an experiment on the wheel and axle, which shows definitely the mechanical advantage of this type of machine. To this is added clean cut demonstrations covering the subject of fixed pulleys, moveable pulleys with two strings and moveable pulleys with three strings, and the mechanical advantage in each case.

***S1.5 Mechanics of Solids—Centrifugal Force

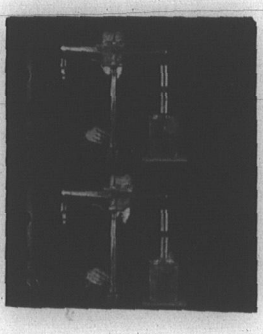


The reel illustrates by means of rotating weights (as in the action of the "governor" of a steam engine), the rotating metal band, and mercury in colored water in rotating glass vessel. The practical application of the principle is shown in the cream separator.

***S1.6 Mechanics of Solids—The Gyroscope

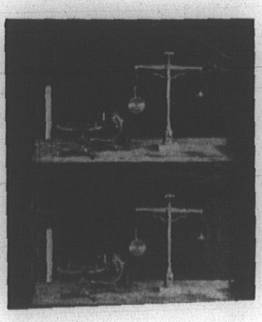
This shows how a rotating body always spins about the shortest axis. Through experiments with a small gyroscope and a bicycle wheel the principles of gyroscopic action are shown, such as the change in direction of precession, the balancing effect against gravity, the rotating effect due to change of axis. This reel gives a very complete series of demonstrations on the subject of the gyroscope with the laws applied thereto. The practical application of the gyroscope to the aeroplane is also shown. This reel will be of interest to schools, due to the fact that the gyroscope has come into use since the present text books were published.

***S1.7 Mechanics of Fluids—Hydrostatics



The experiments illustrate the principles of liquid pressure and shows among others, such important experiments as pressure on the bottom is independent of the shape of the vessel, Archimedes' principle, fluids in communicating tubes and fluids of different densities in the same vessel.

***S1.8 Mechanics of Fluids—Pneumatics



This includes experiments proving that air has weight, that a body weighed in air is buoyed up by the weight of the air displaced, and that air exerts pressure. The application of air pressure in the barometer and the siphon is demonstrated.

***S1.9 Mechanics of Fluids in Motion

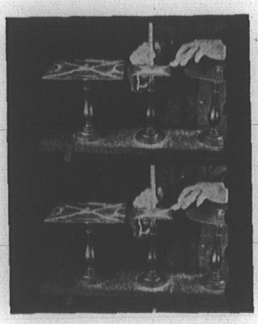
Includes the following experiments; the jet pump, the spray pump, the card and tube, the high pressure and weight, the high pressure and ball, and the high

pressure and screw driver. An experiment showing the varying range of jets issuing from the top, the bottom, and the center of a standpipe is particularly striking. The experiments of Fluids in Motion are not only spectacular but bring clearly to the student, a phase of physics that is often neglected and yet is one of the most important branches of that subject.

***S1.10 Mechanics of Fluids—Molecular Mechanics

Shows the making of capillary tubes, the action of liquids in the tubes and surface tension experiments. Among the surface tension experiments is shown the soap bubble experiment, the effect of camphor and oil upon surface tension. An experiment showing water carried in a gauze cylinder brings out clearly the strength of surface tension.

***S1.11 Sound—Wave Motion



The transverse wave (the tuning fork and ball experiment), the longitudinal wave (the rod and ball experiment) are given. This reel also shows the formation of the sine curve and the well known experiment of sand on vibrating plates.

***S1.12 Sound—Nodes and Antinodes in Vibrating Wire

Segmental vibration of strings, Blackburn's pendulum experiment showing combination of two simple harmonic motions, and the manometric flame experiment are shown.

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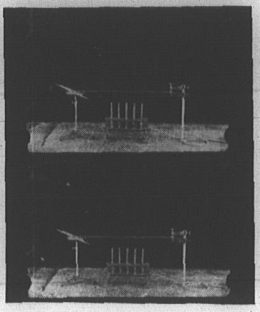
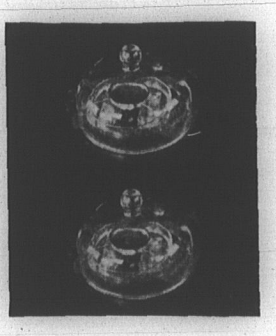
***S1.13 Heat—Expansion and Convection of Solids Liquids and Gases



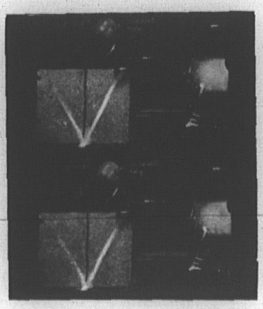
A comparison of metal and wood as conductors is made. Convection currents in liquids, convection in gases (showing a ventilation experiment) are shown.

***S1.14 Heat—Boiling and Freezing



This reel shows water boiling under diminished pressure, and cooling by evaporation. It includes cold by expansion (experiment illustrating the production of carbon dioxide snow at a temperature of −80C, due to the expansion of carbonic acid gas under high pressure), freezing mercury by means of solid carbon dioxide, freezing a rubber tube, boiling and freezing experiment (showing water under reduced pressure boiling and freezing at the same time), and scenes from an ice plant.

***S1.15 Light—Reflection



Covers images through small apertures, inverted images through small apertures, the law of reflection, reflection by means of a spherical mirror, and total internal reflection of a ray of light projected from an electric lantern into a smooth stream of water, (the "fountain of fire").

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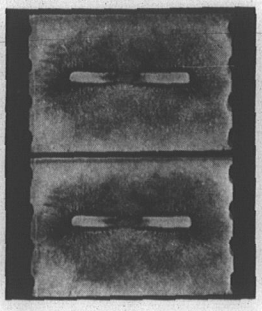
***S1.16 **Light—Refraction**

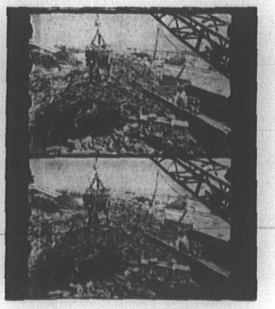
The nature of refraction is shown by means of actual rays of light entering a denser medium (water), also "images formed by a convex lens". This reel also shows on a screen the effect of moving an object toward or away from a convex lens.

***S1.17 **Electricity—Magnetism**



This reel shows the nature of natural magnets, natural magnets attracting iron filings, artificial magnets formed when steel is drawn across the end of natural magnets, bar and horseshoe magnets attracting nails, magnetic poles, Laws of Magnets, magnetic fields about a magnet, magnetic fields between like poles and between unlike poles, magnetic pole strength reduced by heat and recovered on cooling of the magnet.

***S1.18 **Current—Electricity—Magnetic Effects of a Current**



The reel shows the magnetic field due to a current, demonstrates the laws of attraction and repulsion by parallel currents in different directions, the solenoid and several examples of the electro-magnet. The reel also shows how the pole strength of an electro-magnet is increased by increasing the current, the magnetic "suction" within an electro-magnet, the force of attraction exerted by a large U-shaped electro-magnet. The reel ends with examples of a powerful electro-magnet unloading scrap iron.

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***S1.19 Current—Electricity—The Heating Effect of a Current

Is shown by the heating of an iron wire by a current and the effect of a given current on different incandescent lamp filaments. The various types of electric arcs are demonstrated, showing the nature of the arc, the carbon arc in air, the copper arc in air, the flaming arc in air and the electric arc under water. This last scene is most striking in nature.

***S1.20 Electricity—The Simple Voltaic Cell and Electrolysis

The nature of local action and the effect of amalgamating the zinc plate are shown. This subject is followed by the subject of electrolysis and under this subject the electrolysis of water is shown; also the subject of the electrolysis of the solution of lead acetate and the growth of the "lead tree." This reel will be useful in chemistry as well as in physics.

***S1.21 Electricity—Alternating Current Phenomena

In this reel these experiments are performed; the operation of an electro-magnet by alternating current, the lighting of an electric lamp by means of a changing magnetic field due to an A. C. circuit, the heating of a metal ring by electro-magnetic induction, frying an egg by heat developed in the same way, the rotating magnetic field produced by two phase A. C. circuit, and the rotating field shown by iron filings. The principle of induction motor (the type commonly used to operate electric fans and other domestic devices) is illustrated by a metal disc rotating because of the rotating field generated by a two phase A. C. current.

***S1.22 Electricity—Static Electricity

Shows positive and negative electrification of glass and vulcanite rods rubbed with silk, electric attraction and repulsion, the charging of an electroscope by induction and by conduction, the operation of a static electric machine, electrification of silk threads and rotation of a tinfoil covered rod, provided with pin points, when charged from the machine, charging and discharging a Leyden jar and the operation of a lightning rod.

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***S1.23 **Static Electricity—Vacuum Tubes and High Tension Phenomena**

(*a*) Covers various vacuum tube experiments as the electric discharge from a Uranium goblet in a bell jar, the electric glow in a small Crookes' tube, the mechanical rotation of a small wheel in a vacuum tube, due to the impact of the cathode rays, and an X-ray tube in operation; and (*b*) Covers high tension phenomena, as the electric discharge from a high tension coil, electric discharge of high potential and frequency from coil to finger, lighting an incandescent lamp by discharge from the induction coil through the body, the operation of a large Tesla coil having a pressure, at the discharge terminals, of about 400,000 volts and the setting up of apparatus, sending and receiving messages at a wireless station.

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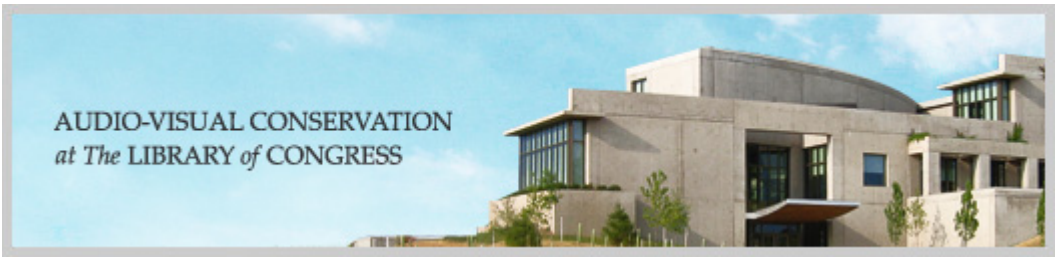

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